

## **Process for producing packaging items for light goods**

The present invention relates to a process for packaging goods with a vertical packaging machine in a film, whereas cross seals are applied to a film tube with sealing means.

Nowadays, goods with a very low and/or changing packaging density like for example salads are packaged with a vertical packaging machine into packaging items made of a plastic film. The packaging items are produced by applying a cross seal to a film tube, inserting the light goods into the cross sealed film tube via a fill pipe and applying another cross seal in order to close the packaging item; i. e. a bag. However, this process has the disadvantage, that due to the low packaging density of the goods, these packages are either very large or very small amount of goods can be packaged into a given bag.

It was therefore the objective of the present invention to improve the packaging process for goods with a low and/or changing packaging density.

The problem is solved by a process for packaging goods on a vertical packaging machine into a film, whereas a film tube is formed and a cross seal is applied to the lower end of a film tube to form the bottom of a packaging item, whereas the film tube above the sealing means is lowered while the film tube is at least partially fixed by sealing means and/or fixing means, to an extent that at least the bottom of the packaging item expands.

Preferably, one portion is filled into tube, while the tube is fixed. Preferably, this fill in of the portion expands the bottom of the packaging item.

Preferably or according to another subject matter of the present invention, at least parts of one portion to be packaged are collected in the film tube and/or in a fill pipe and then dropped downwards and that the impact of the falling portion is used to compress the portion.

An other subject matter of the present invention is a process for packaging goods on a vertical packaging machine into a film, comprising the following steps:

- a. cross-sealing of the lower end of a film tube to form the bottom of a packaging item,
- b. filling one portion of the goods into the film tube,
- c. fixing the lower end of the film tube and/or the portion in its vertical position
- d. releasing the fixed portion and the film tube,
- e. vertically transporting and/or dropping the film tube,
- f. dropping the portion,
- g. stopping the transportation of the film tube,
- h. cross sealing the upper end of the film tube to form the top of the packaging item and
- i. separating the packaging item from the film tube,

whereas the sequence of the steps is not fixed, at least one step is executed twice and /or the steps can be carried out simultaneously.

Further preferred embodiments are claimed in the dependant claims 6 – 16.

With the inventive process, it is possible to improve the packaging of goods, like salad, with a low and/or over the year changing packaging density. Due the expanded bottom of the packaging item and/or due to the impact of the falling portion, the goods are compressed and/or more goods can be filled into a given bag. The process is easily executed and can be carried out on nearly all vertical flow wrappers. Even existing flow wrappers can be modified easily in order to execute the inventive process.

The inventive process will now be described in greater details hereinafter in connection with the **figures 1 – 3** which illustrate different embodiments of the present invention, without limiting the scope of protection of the present invention.

**Figure 1** shows one embodiment of the inventive process.

**Figure 2** shows an other embodiment of the inventive process.

**Figure 3** shows a third embodiment of the inventive process.

In **figure 1**, one embodiment of the inventive process is depicted. On the left hand side a vertical packaging machine is schematically depicted. The packaging machine comprises a fill pipe 10 which is surrounded by a film tube 1. The film tube 1 can be made out of a flat film web by applying a longitudinal seal with longitudinal sealing means which are not depicted, but which are known by a person skilled in the art. The film tube 1 is transported along the film pipe 10 by transporting means 17. At the lower end 5 of the film tube 1, there are sealing means 9. With these sealing means cross seals 13, 14 are applied to the film tube. The movement of the sealing means 9 is depicted by arrows 15. As soon as the sealing means move together, the film tube 1 is at least partially fixed. In the next drawing of figure 1, the closed sealing means 9 is shown in order to apply the cross seal 13 to the film tube 1. The bottom 2 of the packaging item is now V-shaped. The sealing means 9 fix the lower end 5 of the film tube and the portion 4 in its vertical position 6. In the next picture, the sealing means remain close and one portion 4 to be packaged is filled into the film tube 1 via the fill pipe 10, but has not yet dropped to the bottom of the packaging item. Before, simultaneously or after the dropping of the portion on the bottom 2 of the packaging item, the upper part of the film tube 1 is transported vertically by transportation means 17, as depicted by arrow 16, in order to expand that at least, the bottom 2 of the packaging item, as can be seen in the fourth drawing from the left. Preferably the dropping portion enhances the expansion of the bottom. Afterwards, the sealing means 9 are open, so that the film tube and the portion 4 are released. It can be clearly seen, that the expanded bottom 2 remains in its altered shape. Finally, the film tube 1 is moved downwardly by the transportation means 17. The total transportation-length of the film tube is equivalent to the height of the packaging item. After the downward movement 16 of the film tube 1 has been stopped, the cross seal 14 is applied, as depicted in the very right drawing of figure 1. This cross seal 14 is applied to the film tube by moving the sealing means 9 together and the process continues from the start.

In **figure 2**, an other embodiment of the inventive process is shown. Additionally to the features of the packaging machine as already explained in figure 1, the packaging machine according to figure 3 comprises fixing means 12 which can be for example rods. These fixing means can be moved together and apart as depicted by arrows 18, in order to maintain parts of the film tube 1 and at least parts of the portion 4 in their vertical position. In a first step, sealing means 9 are moved together in order to apply a cross seal to the film tube 1. Subsequently, the portion 4 is added to the sealed film tube 1 via the fill pipe 10. The sealing means 9 remain closed in order to fix the film tube 1 as well as the portion 4 in their vertical positions. However, a person skilled in the art understands that this is not essential for the embodiment of the inventive process according to figure 2. As can be seen from the forth drawing from the left, subsequently fixing means 12 are moved together in order to clamp the film tube 1 and the portion 4 in their vertical positions. Regarding figures 2 and 3, the person skilled in the art understands, that the fixing means need not touch each other, but just clamp the portion 4 between them by a certain extent. After the fixing means 12 have been applied, the film tube above the fixing means is lowered to a certain extent by the transportation means 17, as depicted by arrow 16, so that wrinkles 11 are formed in the film tube 1 and the bottom 2 of the packaging item expands. The length of the transportation 16 of the film tube 1 is equivalent to the needed height for the bag 3 including cross seal 14. Subsequently, first the sealing means 9 and then the fixing means 12 are moved apart, so that the preformed film tube 1 which covers the portion 4 and the portion 4 rushes downwards. This downward movement causes a compression of the packaging goods and/or enhanced the expansion of the bottom of the packaging item. Finally, cross seal 14 is applied and the finalized packaging item is cut from the film tube. The person skilled in the art understands, that in this example the fixing means are not essentially needed.

The last embodiment of the inventive process is shown in **figure 3**. This embodiment is essentially identical with the embodiment according to figure 3 with the difference that after the application of cross seal 13 and the addition of portion 4 into the sealed film tube 1, the cross seal 15 are moved apart and the film tube is lowered slightly as depicted by arrow 16. After that, the fixing means 18 are moved together (3<sup>rd</sup> drawing from the right) and the part of the film tube 1 above the fixing means 12 is lowered

further, so that wrinkles 11 are formed into this part of the film tube 1 and it expands. As explained already in figure 2, the length of the two downward movements 16 in figure 4 (3<sup>rd</sup> and 4<sup>th</sup> drawing) is equivalent to the final height of the packaging item 3. Finally, the fixing means 18 are moved apart, so that the portion 4 plus the sealed tube move downwards. The portion 4 hits the bottom 2 of the sealed film tube 1 and forms the bag and/or is compressed. The last step is the application of cross seal 14 in order to complete the bag and cut the completed bag from the film tube 1.

The person skilled in the art understands, that the all inventive processes can be executed intermittently or continuously.

**Reference numbers**

1	Film tube
2	bottom of the packaging item
3	Packaging item
4	portion
5	lower end of the film tube
6	vertical position of the film tube and/or portion
8	upper end of the film tube to form the top of the packaging item
9	sealing means
10	filled pipe
11	wrinkles
12	fixing means
13, 14	cross seal
15	arrow depicting the movement of the sealing means
16	arrow depicting the movement of the film tube
17	transportation means
18	arrow depicting the movement of the fixing means